



Road to a Better Teabag

Micro Laser Technology GmbH (MLT), located in Kirchheim / Munich, was founded in 2000. We are well known in different industries as a qualified & competent system manufacturer of tailor-made laser material processing systems for industrial applications and operations, such as perforation, scribing/scoring (defined material weakening), embossing and marking. More than 70 machines are already in operation worldwide in the tobacco, paper, packaging, food and automotive supplier industries. ([By Monique Evans & Dominik Fernandez](#))

Through our mission, laser excellence, MLT plays a leading role as a System Integrator in the area of micro laser machining. MLT laser systems are based on high standards with

customer-specific adaptability and cutting-edge laser processing technologies.

Project Target

MLT entered into the tea industry out of

pure necessity. We had been informed by clients that there was something lacking when it came to teabags. A request from a Southeast Asian teabag manufacturer to improve teabag performance; this was the convincing factor to make the transition.

MLT was faced with the difficult task to develop a machine that fulfilled the needs of the tea industry that weren't being met. The goals were to achieve significant cost savings through teabag grammage reduction while maintaining existing product quality characteristics (taste, aroma, color).

It Starts with an Idea

Through much research and thought, the workings of the machine were slowly developed. Technology that would allow for a laser perforated teabag filter material to facilitate small tea leaves/tea dust particles transferring into the cup (this is called quality perception) was developed.

Due to the increased infusion rate with perforated filter material, less raw tea would be required.

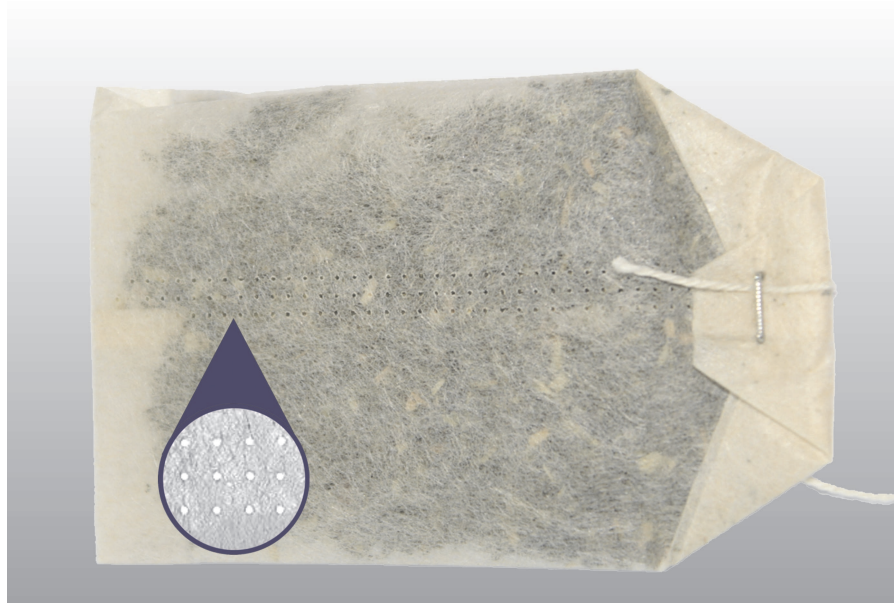
Technology Background

MLT's established experience with manufacturing machines for other industries was the basis for achieving the ultimate teabag perforating machine. The technology was derived from offline laser perforation systems for micro perforation of cigarette tipping paper.

Several laser trials were completed with varying parameters (hole diameter, hole-to-hole distance, amount of holes) to determine the best solution. Depending on tea type, 200-600µm holes in 3-6 rows with a hole-to-hole distance of 2-10mm in the machine direction are required.

Initial sensory testing by the customer confirmed 1.5g of raw tea was needed with the new design, versus the 2g with standard teabags. This resulted in a needed 25% raw material savings.

The teabag filter material can be perforated either online or offline. The online



Close-up of teabag with laser perforated holes

solution for integration in the teabag production equipment requires scanner technology. There are two options for the offline converting of the material. For offline off-

site operation at the filter paper manufacturer, the MLP-F series would be appropriate. Customers preferring an offline solution onsite in their own facility could take advantage of the MLP-10 machine with slitter



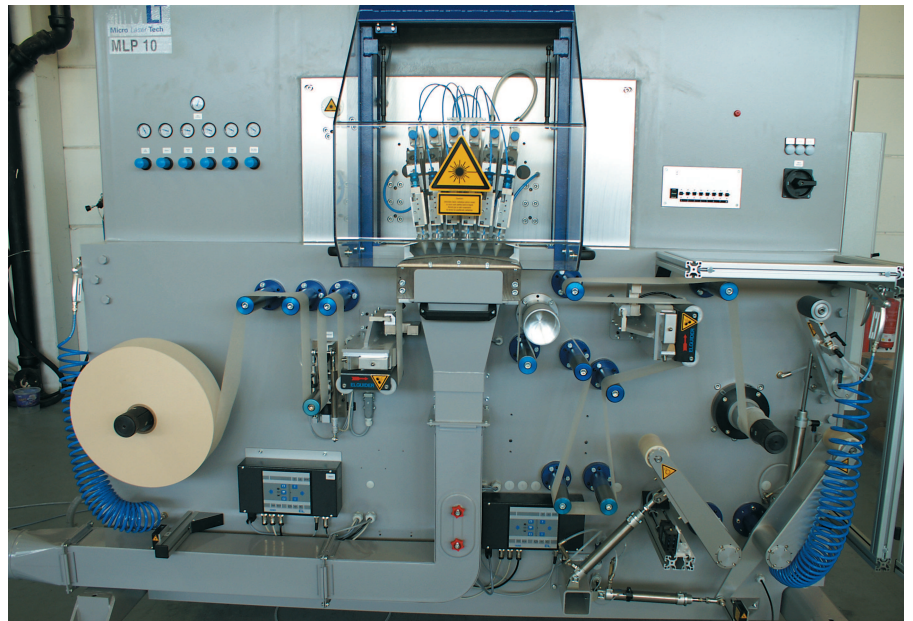
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and winding station. For both offline solutions, the patented vario-polygon-technology ensures that ventilation degrees can be changed quickly and automatically while using the most efficient laser power setup.

Benefits

The new technology along with the careful trials conducted by MLT resulted in many advances in teabag perforation. While an online laser solution is possible, the offline solutions offer a more economical approach. Machines for the offline solutions are retro-fittable, meaning it is upgradeable with increased laser power based on production needs. There is also the option of single or multiple bobbin use (with slitting station) for smaller or larger production quantities.

The unique offline onsite solution allows for building a buffer of pre-processed material to fit production capacities and the MLP-10 system perforates an extremely consistent hole-to-hole quality which results in minimum standard deviation, thus giving high reliability. The



MLP10 system for offline onsite production including micro-perforation, rewinder and CO2 laser source

machines are intended for both small and large production quantities (machine concept specified to fit production needs).

The manufacturing of these machines proves that filter teabag performance can

be improved through laser perforation without adversely affecting product quality and raw material reduction of 25% is due to improved infusion through laser perforated holes. ☕

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